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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/811,812	03/30/2004	Eiju Komuro	P25117	2851

7055 7590 07/27/2006

GREENBLUM & BERNSTEIN, P.L.C.
1950 ROLAND CLARKE PLACE
RESTON, VA 20191

EXAMINER	
DAHIMENE, MAHMOUD	

ART UNIT	PAPER NUMBER
1765	

DATE MAILED: 07/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/811,812	KOMURO ET AL.	
	Examiner	Art Unit	
	Mahmoud Dahimene	1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 March 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *8-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *8-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ~~8/11/05; 8/30/05~~ 6/30/04; 8/03/04; 8/25/05
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Mr. D

DETAILED ACTION

Withdrawal of Restriction mailed on 06/13/2006

The third restriction mailed on 06/13/06 has been reconsidered and withdrawn. Upon reconsideration, it was deemed that groups I (claims 8, 10-13) and II (claims 9, 14-17) failed to qualify as species because "claims are never species" see MPEP 806.04(e). The second restriction mailed on 02/21/2006 is maintained. The office action below addresses applicants response filed on 03/17/2006.

Election/Restrictions

Applicants election, with traverse, of group III, claims 8-17, filed on 03/17/2006, is acknowledged. Applicant's election with traverse of group III, claims 8-17 in the reply filed on 03/17/2006 is acknowledged. The traversal is on the ground(s) that the Examiner has not shown that a concurrent examination of these groups would present a "serious burden" on the Examiner. This is not found persuasive because burden has properly been established because the restriction requirement mailed on 02/21/2006 sets forth proper reasons for distinctness and the separate classification of groups I-III is evidence of a burdensome search.

The requirement is still deemed proper and is therefore made FINAL.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 8-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Irie et al. (US 6,903,491) in view of Ylilammi et al. (US 6,839,946).

Regarding claim 8, the reference of Irie discloses a method of manufacturing a piezoelectric thin film resonator wherein after forming a piezoelectric film on a substrate so as to cover a lower electrode formed on the substrate, forms an electrode material layer for forming an upper electrode above the piezoelectric film, forms a mask of a predetermined form on the electrode material layer, and then etches the electrode material layer to form the upper electrode (column 5, lines 24-59).

A difference is noted between applicants claim 1 and the reference of Irie, Irie fails to disclose, before a step of forming the electrode material layer, a protective layer for protecting the piezoelectric film during etching of the electrode material layer is formed so as to cover at least a part of the piezoelectric film where the upper electrode is not formed, and the electrode material layer is then formed so as to cover the protective layer.

The reference of Ylilammi discloses a method for fabricating a thin film bulk acoustic wave resonator (FBAR), including a piezoelectric resonator on a glass substrate wherein "a second protective layer may also be formed on the structure to protect the piezoelectric layer during the formation of the vias and/or during the etching of the sacrificial layer" (column 3, line 15).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Irie to include a protective layer on the piezoelectric layer for protecting the piezoelectric layer during etching of the upper electrode because Ylilammi teaches the step of using a protective layer on the piezoelectric layer for protecting the piezoelectric layer during etching when etching a layer positioned above the piezoelectric layer. One of ordinary skill in the art would have been motivated to use a protective layer in order to improve reliability of the resonator by preventing the etching of the top electrode to induce any damage on the piezoelectric layer, the modified method would in turn allow a wider range of etching conditions (including faster etch rates) to be performed with limited risk of damaging the piezoelectric layer.

As to claim 9, Irie cites "the piezoelectric resonator is used in electronic components such as oscillators, discriminators and filters" (column 15, line 63).

As to claim 10, it is noted that Irie fails to disclose, before a step of forming the electrode material layer, a silicon oxide protective layer for protecting the piezoelectric film during etching of the electrode material layer is formed so as to cover at least a part of the piezoelectric film where the upper electrode is not formed, and the electrode material layer is then formed so as to cover the protective layer.

As discussed above the reference of Ylilammi discloses a method for fabricating a thin film bulk acoustic wave resonator (FBAR), including a piezoelectric resonator on a glass substrate wherein "a second protective layer may also be formed on the structure to protect the piezoelectric layer during the formation of the vias and/or during the etching of the sacrificial layer" (column 3, line 15). It is noted that Ylilammi discloses aluminum material for the second protective layer, however, Ylilammi also discloses a silicon oxide protective layer (48) for protecting the bottom electrode when etching a sacrificial layer (44) (column 2, line 66). Ylilammi clearly teaches silicon oxide is conventionally used as a protective layer in piezoelectric resonator formation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the process of Irie to include a silicon oxide protective layer on the piezoelectric layer for protecting the piezoelectric layer during etching of the upper electrode because Ylilammi teaches the step of using a protective layer on the piezoelectric layer for protecting the piezoelectric layer during etching when etching a layer positioned above the piezoelectric layer, and protective layers materials

include silicon oxide. One of ordinary skill in the art would have been motivated to use a silicon oxide protective layer on the piezoelectric layer in order to improve reliability of the resonator by preventing the etching of the top electrode to induce any damage on the piezoelectric layer when silicon oxide provides better protection than aluminum provided silicon oxide does not negatively affect the operation of the resonator.

As to claim 11, Irie cites zinc oxide as a material used for piezoelectric resonators (column 9, line 17).

As to claim 12, Irie discloses noble metals are conventionally used for the upper electrode (column 5, line 66), and gold is conventionally used for electrode material (column 10, line 12).

As to claim 13, Irie discloses a wet etch for etching the upper electrode (column 6, line 1).

As to claims 14, 15, 16, 17, Irie cites "the piezoelectric resonator is used in electronic components such as oscillators, discriminators and filters" (column 15, line 63)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mahmoud Dahimene whose telephone number is (571) 272-2410. The examiner can normally be reached on week days from 8:00 AM. to 5:00 PM..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mahmood/.

MD.

NADINE NORTON
SUPERVISORY PATENT EXAMINER